CLAIMS

WE CLAIM:

1.   A support structure monitoring system for an elevator, comprising:

at least one temperature sensor disposed in a hoistway;

a characteristic sensor that obtains a measured electrical characteristic of at least one portion of the support structure; and

a processor that translates at least one of the measured electrical characteristic and an electrical characteristic of at least one portion of a virgin support structure to correspond with a reference temperature to reflect an effect of a temperature in the hoistway as indicated by said at least one temperature sensor, wherein a value corresponding to the measured electrical characteristic is a measured value and a value corresponding to the electrical characteristic of the virgin support structure is a reference value,

wherein the processor calculates a difference between the measured value and the reference value and compares a value corresponding to the difference with a predetermined threshold to determine a support structure condition.

2.   The system of claim 1, wherein the processor calculates the reference value by translating the electrical characteristic of said at least one portion of the virgin support structure, wherein the reference temperature is equal to the temperature in the hoistway as indicated by said at least one temperature sensor and the measured value is equal to the measured electrical characteristic.

3.   The system of claim 1, wherein the processor detects a temperature change in said at least one sensor to a new temperature and recalculates the reference value based on the new temperature.

4.   The system of claim 1, wherein the processor divides a difference between the measured value and the reference value by the reference value to obtain a percent change value, which acts as the value corresponding to the difference, and wherein the processor indicates a worn support structure if the percent change value exceeds the predetermined threshold.

5.   The system of claim 1, wherein the value corresponding to the difference is the difference itself between the measured value and the reference value, and wherein the processor indicates a worn support structure if the difference exceeds the predetermined threshold.

6.   The system of claim 1, wherein said at least one temperature sensor comprises a plurality of temperature sensors, and wherein the processor calculates the reference value based on temperature readings obtained from the plurality of temperature sensors.

7.   The system of claim 6, wherein the plurality of temperature sensors are spaced a uniform distance from each other along the hoistway.

8.   An elevator support structure assembly, comprising:

at least one temperature sensor;

a characteristic sensor that obtains a measured electrical characteristic of at least one portion of the elevator support structure; and

a processor that

determines a temperature associated with at least one portion of the elevator support structure from said at least one temperature sensor, and

translates at least one of the measured electrical characteristic and an electrical characteristic of at least one portion of a virgin support structure to correspond with a reference temperature to reflect an effect of a temperature as indicated by said at least one temperature sensor, wherein a value corresponding to the measured electrical characteristic is a measured value and a value corresponding to the electrical characteristic of the virgin support structure is a reference value, and

calculates a difference between the measured value and the reference value and compares a value corresponding to the difference with a predetermined threshold to determine a support structure condition.

9.   The assembly of claim 8, further comprising a user interface that indicates that the elevator support structure is worn if the difference exceeds a predetermined threshold.

10.   The assembly of claim 8, wherein the processor calculates the reference value by translating the electrical characteristic of said at least one portion of the virgin support structure, wherein the reference temperature is equal to the temperature in the hoistway as indicated by said at least one temperature sensor and the measured value is equal to the measured electrical characteristic.

11.   The assembly of claim 8, wherein the processor divides the difference between the measured value and the reference value by the reference value to obtain a percent change value, which acts as the value corresponding to the difference, and wherein the processor indicates a worn support structure if the percent change value exceeds the predetermined threshold.

12.   The assembly of claim 8, wherein said at least one temperature sensor comprises a plurality of temperature sensors uniformly spaced with respect to each other along the hoistway.

13.   A method of monitoring an elevator support structure condition, comprising:

measuring a temperature associated with at least a portion of the support structure;

obtaining a measured electrical characteristic of at least one portion of the support structure;

translating at least one of the measured electrical characteristic and an electrical characteristic of at least one portion of a virgin support structure to reflect an effect of the measured temperature, wherein a value corresponding to the measured electrical characteristic is a measured value and a value corresponding to the electrical characteristic of the virgin support structure is a reference value;

calculating a difference between the measured value and the reference value; and

comparing a value corresponding to the difference with a predetermined threshold to determine a support structure condition.

14.   The method of claim 13, wherein the support structure comprises a plurality of portions, wherein the step of determining the temperature comprises obtaining a plurality of temperature values, each temperature value associated with a different portion in the support structure,

and wherein the step of determining the reference value comprises translating the electrical characteristic of each portion of the virgin support structure based on the temperature of that portion and summing the translated electrical characteristics of the portions of the virgin support structure.

15.   The method of claim 13, wherein the translating step determines the reference value by translating the electrical characteristic of said at least one portion of the virgin support structure, wherein the reference temperature is equal to the measured temperature and the measured value is equal to the measured electrical characteristic.

16.   The method of claim 13, further comprising obtaining a percent change value based on the reference value, wherein the indicating step indicates a worn support structure if the percent change value exceeds the predetermined threshold.

17.   The method of claim 13, wherein the step of determining the reference value comprises determining the electrical characteristic of at least a portion of the support structure in a known condition at a plurality of temperatures.

18.   The method of claim 17, wherein the known condition is a virgin support structure condition.

19.   The method of claim 13, wherein the electrical characteristic is resistance.